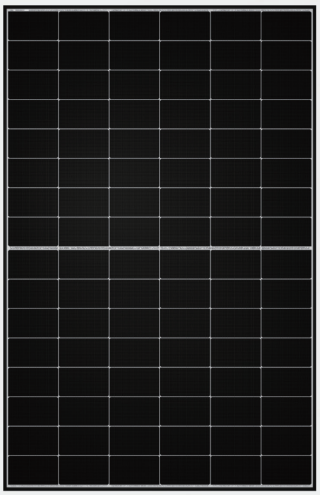
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TW SOLAR

TNC 2.0

N-type Half-cell Bifacial Dual glass Black Frame and Transparent Module (48)

TWMNH-48HD



- High light transmittance, suitable for carports and balcony scenarios
- Compact size and lightweight, hassle-free operation and low maintenance
- Increased power, lower transportation cost
- Integrated design, perfectly blending with architectural aesthetics

445-465W

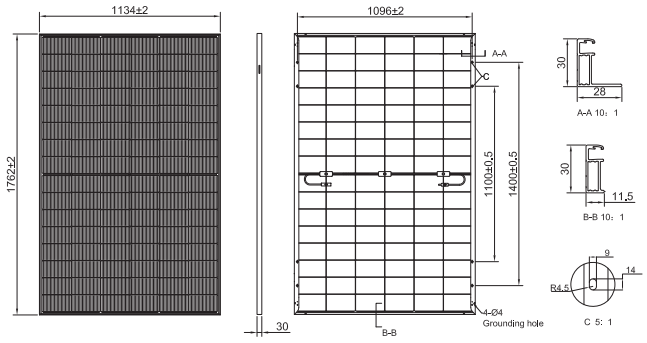
Carport Roof | Balcony



* The images shown above are for reference only. The actual product delivered shall prevail.

TWMNH N-type Half-cell Bifacial Dual glass Black Frame and Transparent Module (48)

Drawings (Unit: mm)



Electrical Characteristics (STC)

Module type: TWMNH-48HDXXX					
Maximum Power: Pmax [W]	445	450	455	460	465
Open Circuit Voltage: Voc [V]	35.55	35.75	35.95	36.15	36.35
Short Circuit Current: Isc [A]	15.92	15.95	15.98	16.05	16.12
Voltage at Maximum Power: Vmp [V]	29.93	30.19	30.44	30.69	30.94
Current at Maximum Power: Imp [A]	14.87	14.91	14.95	14.99	15.03
Module Efficiency: η [%]	22.3	22.5	22.8	23.0	23.3

* STC: Irradiance 1000W/m², Cell temperature 25℃, AM=1.5, Power measurement tolerance: ±3%

Electrical Characteristics (BNPI)

Maximum Power: Pmax [W]	491.5	496.9	502.3	507.9	513.3
Open Circuit Voltage: Voc [V]	35.55	35.75	35.95	36.15	36.35
Short Circuit Current: Isc [A]	17.57	17.61	17.64	17.72	17.80
Voltage at Maximum Power: Vmp [V]	29.93	30.19	30.44	30.69	30.94
Current at Maximum Power: Imp [A]	16.42	16.46	16.50	16.55	16.59

* BNPI: Front side irradiance 1000W/m², Rear side irradiance 135W/m², Cell Temperature=25℃, AM=1.5
Power measurement tolerance:±3%

Electrical characteristics with different rear side power gain

5%	Maximum Power: Pmax[W]	467	472	477	483	488
	Module Efficiency: η [%]	23.4	23.6	23.9	24.2	24.4
15%	Maximum Power: Pmax[W]	511	517	523	529	534
	Module Efficiency: η [%]	25.6	25.9	26.2	26.5	26.7
25%	Maximum Power: Pmax[W]	556	562	568	575	581
	Module Efficiency: η [%]	27.8	28.1	28.4	28.8	29.1

Temperature Rating

Temperature Coefficient of Pmax	-0.28%/℃
Temperature Coefficient of Voc	-0.24%/℃
Temperature Coefficient of Isc	+0.046%/℃

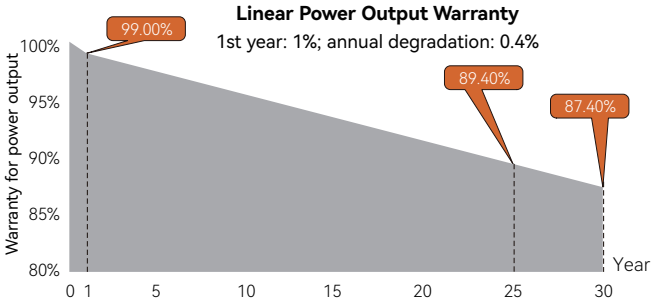
Operating Parameters

Operating Temperature	-40℃~+70℃
Maximum System Voltage	1500V DC
Maximum Series Fuse Rating	30A
Power Output Tolerance	0~+3%
Bifaciality coefficient of Pmax	80±10%
Bifaciality coefficient of Voc	98±5%
Bifaciality coefficient of Isc	80±10%

Mechanical Parameters

Cell Type	TNC
Cell Orientation	96[6×16]
Dimension	1762±2×1134±2×30mm
Weight	24.3kg
Front Glass	2.0 mm AR coating semi tempered glass
Rear Glass	2.0 mm semi tempered glass
Frame	Anodized aluminum alloy black frame
Junction Box	IP68, 3 diodes
Cable	4.0mm²
Cable Length	±1,200 mm, length can be customized
Maximum Static Test Load	5,400 Pa (front) / 2,400 Pa (rear)
Packaging (Per pallet)	36 pcs
Packaging	936 pcs per 40'HC

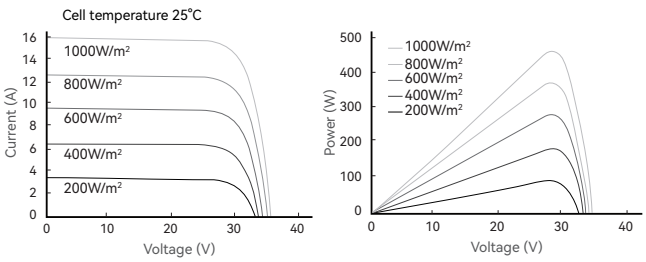
Warranty



15 15-Year Material and Workmanship Warranty

30 30-Year Linear Power Output Warranty

Curve



Certifications

Quality Management System and Product Certification

ISO 9001: 2015 / Quality Management System
ISO 14001: 2015 / Environmental Management System
ISO 45001: 2018 / Occupational Health and Safety Management System
ISO 50001: 2018 / Energy Management System
IEC 62941: 2019 / Quality System for PV Module Manufacturing
IEC 61215 (2021) / IEC 61730 (2023), IEC TS 62804,
IEC 61701, IEC 62716, IEC 60068-2-68

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Statement: With technological process and product update, there maybe deviation between the technical parameters of Tongwei's module products and the technical parameters contained in the specification, and Tongwei Solar has the right to adjust the technical parameters at any time without notifying the customer, the final interpretation of the technical specification is vested in Tongwei Solar. (Ver.20251202)